Avrami理論の著者について

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Ａｖｒａｍｉ理論の著者について

Mael Avrami Melvin氏の手紙 ----- 九大・理　関本　謙
川崎から Melvinへ ---------- 九大・理　川崎　恭治
Melvinから川崎へ ---------- M. Ｍｅｌｖｉｎ

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Mael Avrami Melvin氏の手紙

以下に転載されるのは、1940年代初め頃に相度化の速度論の著名な仕事[1]で物性研究者の知る所となった M. A. Melvin氏が、昨年夏、川崎恭治氏宛に送られた手紙の原文です。この手紙は川崎氏が固体物理[2]に M. A. Melvin氏について解説を書かれる為の資料として送られたもので、その内容は解説[2]にほぼ再現されています。又、M. A. Melvin氏の仕事[1]の内容及び同様の内容を同時代に独立に発見した他の人々の研究[3]等についても、既に小岩昌宏氏が解説[4]しておられます。にもかかわらず、物性研究編集部が手紙の原文を掲載する理由は、（掲載原稿の不足は別として）川崎氏の解説を読んで Melvin氏本人の手記を見たく思われた人に供する為だと前書きの著者（関本）は考えます。

彼の理論[1]はつとに知られていますが、なぜ彼が名を変えたかとか、なぜ戦後専門を変えたかについて謎だったために解説[2],[4] が書かれたようです。その辺は解説を参照していただくことにして、Avrami（改名前のMelvin氏の名字）の理論（或は Kolmogorov-Johnson-Mehl-Avrami理論）とは何か一言説明します。相Ⅰにある物質中にランダムに相Ⅱの核生成がおこり、それら各々を中心として定速度で相Ⅱ領域が成長するとします。但し、既に相Ⅱになった所では核生成はあり得ず、又相Ⅱ領域同志が成長してぶつかった所では成長はとまるとします。こういう状況のもとで任意時刻の２相の体積比率を与えるのが彼らの理論です。Johnson-Mehl[2]と Melvin[1]はこれを冶金の相変態の問題として設定し解きました。一方、Kolmogolov[2]は本質的に同じ問題を確率過程論の見方で解きました。後者の考え方を拡張すれば、同じ問題で２相のパターン発展に関するｎ点時空相関もわかります。[5]

ともかく、Melvin氏の手紙は彼の理論とは切り離しても、大戦後期にLos Alamosに背を向けていたアメリカ人科学者の手記として残るものだと思います。

（関本　謙 記）

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July 7. 1988

Professor Mael Melvin
1300 Orchid Drive
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CA 93111
U.S.A.

Dear Mael:

It is unbelieve that it is almost four years since I last visited you at Santa Barbara,and I hope that you and your family are doing well.

As I may have told you at that time your very early works on domain growth (the Avrami theory)is now very famous in this country. Still lots of mysteries surround the author. For instance, I know at least one reputable physisist who insisted that Avrami must be a female scientist.

Recently I was asked to write about the author of the Avrami theory by an editor of a journal "Kotai-Butsuri"(a journal on solid state physics in Japanese). Thus, I am wondering if you agree with my writing such an article. If you agree, then could you send me some background materials such an a biographical sketch, a copy of your recent photo which will appear in my article, a brief account of the circumstances under which the Avrami theory was put forward, and also the reason for changing your family name, to the extent that you permit me to use in the article.

Ever since I have known the connection of the Avrami theory and you,I have always felt that the author of such a fundamental work should receive much wider recognition which he obviously deserves.

Finally please give my best regard to Sophia.

Sincerely yours

Kyozi

August 1988

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CA.93111

Dear Kyozi,

Please do not think of me too unkindly for taking so long to answer your very kind letter of July 7. It has been a very busy month with our traveling up the West Coast to visit family--including a foreign visitor--and also our East Coast son and family who are staying in the San Francisco Bay area for a year. He is on Sabbatical from Bryn Mawr and will be teaching at Stanford and working in the Berkeley mathematics department. We have 2 and 2/3 grandchildren in that branch, and 2 grandchildren from our West Coast older son's branch. He is on the staff of the California Institute of Technology in Pasadena, and we also had a visit from him and his family in conjunction with a return visit from our younger East Coast son and his family.

Now about your request for biographical material for an article in "Kotai-Butsuri", I will try to satisfy it though I am not accustomed to being biographical. You may use what you choose from the following material. I am particularly willing to do this because the dropping of the nuclear bomb on the cities in Japan--with which I totally disagreed, feeling as I did that it is better to die singly than kill by the million--has had a powerful effect on my life; it was one of the two principal reasons for my resigning my associate professorship at Columbia and leaving academic life for four years.

Re my change of name about which you inquire: simply stated--- for family reasons, I reversed the first and last names which I had carried from childhood to age 34, and added a new first name closely related to the original first name given to me at birth.

In more detail: first I will tell you the story of my initial first names which evolved, by telescoping, into my final first name. My ancestry and parentage was Jewish--apparently from Jews who came out of Spain, through England and the Scandinavian countries and into the Baltic countries. There were leaders among them even as recently as my mother's grandfather by the name of Yoel Moshe Solomon (1838-1912) / whose own grandfather Zalman Tsoref("Gold-and Silver-smith")

1786-1851 was among the first western (European) Jews to emigrate to Palestine (now Israel) . Yoel Moshe's grandfather and his father had already corresponded extensively with the English Jewish philanthropist Sir Moses Montefiore on the importance of developing agricultural activity by the Jewish people. Yoel Moshe was a writer, a printer, a city-builder and leader of the group of three who founded the "mother of agricultural settlements" in Palestine--now the town of Petah-Tiqva ("Gate of Hope"). I was born in the year following his death, and could admissably be named after him (Jewish custom). Correspondingly, as I was the firstborn of the eldest grandchild (my mother) of Yoel Moshe, I was named Moshe Yoel. My parents, American citizens, were in Palestine at the time and I was born there. A year later they came to the United States and remained here. When I was a very small boy and taken for the first time to a preparatory school by an adult cousin, it was decided to give me what was then considered to be a palatable English equivalent equivalent of Moshe. That is how, in youth, my first name became "Melvin", and which later, since late 1947, became my surname.

Avrami was not an ancestral name but it was the name given to me and carried from boyhood in school in Palestine 1925-30, through my undergraduate and graduate education at the University of Chicago (1930-36) and through to 21st July 1947 when my name was changed legally to M. Avramy Melvin. "M" stands for Mael, a euphonious condensation of the double name given to me at infancy. It has the advantage that it can be and is almost always pronounced monosyllabically. If pronounced as two syllables, as "Ma - el", it is the Hebrew language statement "What is God?", which could hardly be bettered as a statement of my life-long search for "What is reality?"

Now why did I change my name in 1947? Sophia and I met and were married in 1946. We had one child and our second child was already conceived. My two younger brothers had mentioned at an earlier time that they intended to change the surname "Avrami" to something more "American" to avoid having people who were anti-Jewish prejudiced against them because they thought the name was Jewish, and people who were anti-Italian prejudiced against them because they thought the name was Italian. They changed their name to"Avery" but I chose to perform a reflection operation on my name. I had, in addition to a motivation similar to theirs--wanting to spare our two sons being

saddled with a name foreign to America -- also a strong impulse to break with my previous life. I was beginning to consider resigning my tenured position at Columbia and leaving academic life for a time. I felt a revulsion against civilization and the application of science to the killing of many people, and a pull to a more spiritual existence. The University authorities urged me merely to take a leave of absence but, with the loyal support of my wife, I persisted in wanting to leave academic life. I remember talking of my intention with the distinguished physicist, Walter Heitler, who was at Columbia that year and he said: "In Europe you could never do that (resign and withdraw from the University system) and hope to return later to academic life." Well in America it was still possible to do it. We lived for four years, 1948-1952, with our savings and some meager earnings, as a caretaker, on the island of Orcas in Puget Sound. Then, after submitting to the Guggenheim Foundation some papers on generalized symmetry which I wrote at Orcas, I received my first Guggenheim Fellowship grant. We went to Princeton briefly and from there I was recommended by Ewald, Bethe and Wigner to a position as Professor of Physics at Florida State University in Tallahassee. After 14 years there I accepted a position as Professor of Physics at Temple where we got to know each other.

The other matter on which you request information is on the circumstances in which the theory of "Kinetics of Phase Changes" was put forward. Well, I had worked for my living throughout the last year (1937-38), before getting my Ph.D. at the University of Chicago, at the United States Steel Corporation in Gary, Indiana-- one of the largest steel mills in the world--which was within commuting distance of the University of Chicago. The first few months I worked "shifts" (8 hour periods rotating consecutively through 24 hours in successive weeks) as an "apprentice metallurgist" mainly monitoring temperatures of the glowing rolled steel as it moved through the rollers. But by the end of the year I had worked my way up through experimental research to theoretical research in the Metallurgical Laboratory of the (U.S.Steel) Gary Works. My last research, which as far as I know is buried somewhere in the files of the steel corporation, was on the "Evolution of Hydrogen in Cooling Steel and the Formation of Shatter Cracks". These, of course, could grow into causes of failure (fracture) of train wheels or other heavy metal objects. At any rate this, and the earlier experimental technique for economical and efficient testing

of heat treatment of metals by a temperature-graded furnace (which I designed by a Fourier transform technique) must be why I had such a strong recommendation from the Director of Research of the U.S.Steel Corporation when I went looking for a job at Columbia University in New York. There was no opening in the Physics Department but I was welcomed in the Metallurgy Department of which Dr. Eric Jette was the head. They wanted a physicist to teach metal physics which I did for several years. When the war came, beginning in 1942 and for five years till 1947 I was "lease-lended" to the Physics Department and taught graduate courses alongside of Willis Lamb who also stayed at Columbia during those years while many of the faculty went to Los Alamos. Also like Lamb I was involved in research for the U.S.Government. But at no time was I involved nor did I want to be involved in research for a nuclear bomb.

In the early years from the end of 1938 to 1942, while in the metallurgy department, Jette asked me to look into the theory of the martensite hardening of steel and, with the generalizing tendency that was very strong in me, I was led to develop the Kinetics of Phase Changes papers I,II and III in J.Chem Physics and the related "Geometry and Dynamics of Populations".(Journal of the Philosophy of Science.) I had a fair amount of further work in this area but I unfortunately left it unpublished.

I hope you will forgive me for burdening you with such a long letter but I did not know how to shorten it and yet respond to your requests honestly. Will you also please make my apologies to Professor Masahiro Koiwa at The Research Institute For Iron, Steel And Other Metals for not responding to his letter of 1984. Please explain to him, in the light of this letter to you, why it was so complicated to answer his letter adequately at that time when we were very preoccupied with family and other matters. (My wife's elderly mother is now nearly 96 years old). I did draft part of a letter to him at that time. It never got finished. I am enclosing a copy of this draft. If it does not conflict with your project you may want to make it available to him. Feel free to deal with it as you see fit. I will do nothing unless I hear from you. I hope my neglect has not created a delicate situation for you for whom I have the highest regard.

Cordial greetings to you and your family from Sophia and myself.

Mael